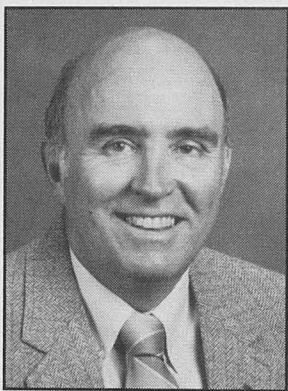


NEW PRODUCTS RELATIVE TO ASPHALTS

Dean Blake

Thank you for inviting me to the 28th annual Transportation Forum. It is a pleasure to be here. It's a fun time to be in the asphalt industry; it's a period of change and challenge.

Kentucky is a leadership state regarding transportation. Just look at the asphalt industry, for example. Several years ago we started the break-seat-and-asphalt overlay program for rehabilitation of worn portland cement concrete pavements and it is now a very common approach all over the United States. We have been a long-time leader in that development. The big-stone asphalt mix, which has received national and world-wide attention, is another product that has been developed through the efforts of Kentucky, and modifications are being made every day to improve that particular product of our business.



Concerning big-stone mix in Kentucky, a couple of years ago we did a modified design on our hot-mix asphalt pavements and came up with a new way to try to attack the problem of heavy-truck traffic, particularly in the coal fields. We have had several hundred thousand tons of the big-stone mix material placed now. Some of the testing results are starting to come in and some of the analyses are being made.

Overall, we have been very pleased with the progress made in improving the ability of a pavement to withstand the heavy, coal-truck traffic. (We are talking about 170,000-180,000 pound trucks running on roads designed to haul 70,000-pound vehicles).

The supreme test has been in Louisa on the U.S. 23 By-pass and, with some exceptions, on the hill sections of that portion, the big-stone mix has performed very well. We do think that there are certain modifications that will be made in the near future that will prove this product even better. Very interestingly, there was an extensive study done in Europe on the asphalt products used there. They have a technique called

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split-mastic asphalt (SMA) which is similar to the big-stone mix. SMA has stone-to-stone contact, but they add some modifiers to the asphalt and have had very great success with it. We are starting to demonstrate SMA jobs in the United States. I had an opportunity to visit a couple of demo projects recently (one with Dwight Walker and Gilbert Newman in Michigan) to see how that was being applied. I understand there is a proposal being considered in Kentucky to try a demo project; hopefully, that can be worked out so that we will have an opportunity to see how this product works.

Kentucky also is among the leaders in the country in the promotion and development of permeable drainage layers or asphalt-treated base layers. Basically, you coat a 57-size (single-size) stone with 1-1/2 to 2 percent asphalt and use it as a drainage layer underneath pavement structures. There has been a lot of successes with these drainage layers, and I think it is going to grow like wildfire all over the country.

We have been asked a lot of questions about that European asphalt study: Since the roads are great over there, why we don't have the same success in this country? Why shouldn't America be the leader in roadways? Well, when you see some of the reasons, it is not hard to figure out the answers. In Europe, the average gas tax is between \$2-\$4 a gallon. Compare that to what we have in the United States and you begin to understand the reasons they can afford the money they spend on their roads. Also, their asphalt contractors receive about \$75-\$80 (in comparative dollars) a ton for mix. In the United States, more particularly in Kentucky, the average price ranges from \$25-\$26 a ton. So, if you're putting triple the amount of money into your product and you have that much resource, you begin to understand that they are buying the very best material available anywhere to address the problem. That is one basic point we need to understand about the European situation.

The other point is that they have spent extensive dollars in base preparation and strengthening of subgrades. In Kentucky, we have seen a major breakthrough in the last 4-5 years in treating subgrades and improving subgrades when there is low CBR values. We are on the right track in that area.

Another aspect of the European situation at which we need to take a close look is contract warranties. We've indicated to our state highway engineer that we have contractors who would like to try this. It is very common in Europe for a contractor to guarantee the performance of pavements for a period of five years or so. Some of the reasons they are able to do that is that they have a role to play in the design and the kind of products they are able to afford to put on the roadway. We are anxious to explore the idea. In Europe, it is very common not to worry about fatigue and cracking and problems like that with the road surfaces, since resurfacing is usually done prior to major problems. The key to resurfacing in

Europe is not the deterioration of pavements, but whether or not noise levels from traffic are too high or whether or not the skid resistance of the pavement is still effective.

One idea that is developing pretty rapidly—even though we have many questions at this point—is the effort to get recycled rubber tires in asphalt. You know we can put anything in asphalt and make a road with it. There has been enormous pressure from environmentalists to encourage the use of rubber tires in asphalt—and it can be done. However, there are certain questions that need to be answered. One in the environmental area is what happens when you mix rubber and asphalt? What are the problems concerning fumes from that product? What are the concerns if you want to recycle the pavement? Is the rubber in the asphalt going to have a detrimental impact? Nobody really knows. What about the costs involved? We suspect there are going to be many problems. Another product that is being promoted to be used in asphalt is glass. There are a lot of ways to use byproducts and waste products, and we can expect more and more pressure in that area. Let's hope that reason and effectiveness will be part of the feasibility.

The use of asphalt recycling trains is another process being used in some areas of the country. This involves the use of a paving train that would actually remove the material from the road and throw it through a rejuvenating processor and dump it back out on the road and windrows, coming back through with a pickup machine which deposits the asphalt in the paver. Thus, hot-mix asphalt is placed on the road not using a central asphalt plant. This has great potential, particularly on low-volume roads.

Another technical advance that is being developed rapidly (to the benefit of the highway users) will help guarantee the quality of the pavement. Nuclear-gage density devices are being placed on rollers so the operator will know immediately whether or not he is getting proper compaction and pavement density without having to guess at it or wait for testing—he will know immediately. This has great potential and there is a lot of interest in our industry to see the concept further developed.

Recently in Kentucky, one of our contractors purchased the first shipment of what we call flow-boy trucks. These are long, huge trucks that have bottom-loading that can drop the asphalt on the road instead of backing the truck bed into the paver and causing that problem of truck and paver bumping. There is a windrow ahead of the paving spread and the idea is to keep the paver operating at a continuous pace. A contractor in Eastern Kentucky recently purchased six of these flow-boys and he is very excited about the potential of that product.

In other states, there have been tremendous advances in the use of pond liners for all kinds of waste products—hazardous waste, garbage,

the whole range—using heavily coated hot-mix asphalt using additional asphalt content for pond liners. The state of Pennsylvania has been ahead in that field. The liners provide a safe and cost-effective method to handle landfills.

The last thing that I want to cover today has to do with the Strategic Highway Research Program (SHRP) and asphalt. Larry Epley and I had an opportunity to attend a two-day meeting in Chicago this week involved in a SHRP task force that is looking into how to implement and how to test some of the theories and ideas being advanced by SHRP in the asphalt area. To say that things are changing or will be changing is an understatement. Things like Marshall Mix Designs may be a thing of the past in a few short years. The idea of asphalt content in Marshall Testing as an important value will fade. Other factors, performance-based specifications, are being developed and this is going to be a tremendous change—and also an opportunity. For the young people, it will be a great time to come into this industry at the bottom and start with this new technology. You will be right in the same ballpark with the guy who has been in the business for 20-30 years because things are changing so rapidly.

SHRP is trying to define the asphalt that we're going to be using in the future. The basic conditions that are going to govern the future will be things like the temperature range at which the product will be used. Temperature is going to be important: the mean temperature, average temperature, the high temperatures, low temperatures. The environmental impact on that pavement—whether or not it will be in a very rainy area of this country, or an area with a lot of snow, or a lot of freezing and thawing, or whether the area is a dry area—those will be factors to be evaluated. There will be new testing equipment; for example, there will be new testing equipment required for low-temperature cracking and it is going to be expensive. We are looking at \$70,000-\$80,000 per lab for new types of equipment just to test asphalt. We are looking at things like dynamic rheometers for pavement deformation tests to try to predict how pavements are going to stand up and what specifications they will require to meet certain traffic conditions, the ability to construct the material—all those things will be reviewed as part of the binder specification.

The term that is being used in regard to asphalt mix design is "MIDAS." We are talking about a design mixture of asphalt and aggregate. The same types of things that will be reviewed for liquid asphalt will be evaluated for mix designs—moisture conditions that the pavement will be subjected to, rapid testing, high and low temperature testing. Traffic and environment are going to be big factors. There will be the use of gyratory compactors. This is a switch from the Marshall equipment that we use today; it is also a relatively new development and is more expensive. These gyratory compactors also will be used for field controls at the contractor's plants.

You can see that this is a really exciting time and we are really looking forward to these new developments. In the United States, we spend nil for research for transportation compared with European countries. We put in about one-eighth the effort that they do if you compare our industry with manufacturing industries, the chemical industry, the coal industry, the rubber industry, any industry you can name; the transportation industry has been way down the list in terms of amount of effort expended for research. In recent years (with the SHRP program), there is starting to be some concentrated research efforts. We are anxiously awaiting the results. It is going to be an interesting and tough time. There will be a lot of changes. We are looking forward to being a part of the effort.

I want to mention a rather recent development. For the first time, there is a complete asphalt textbook that has been produced by the National Center for Asphalt Technology at Auburn. It is an excellent book that has been reviewed by some of the top people in the world and everybody seems pretty happy with it. This book carries a list price of about \$45.00. However, if you will call our office at 1-800-544-8522, we will work out a half-price special on this textbook. In addition, a new *Hot-Mix Asphalt Manual* is ready for release by the sponsors, i.e., AASHTO, FHWA, NAPA, APWA, and the FAA.